

EXECUTIVE SUMMARY

PURPOSE

By 2025 there will be over 5 million people living in the greater Phoenix metropolitan area. Traffic congestion is projected to increase despite substantial transportation investment. Bus service provides over 18 million miles of service annually, but significant expansion is needed to meet user needs.

The Regional Transit System Study (RTS) developed a fiscally constrained regional multi-modal transit plan for Maricopa County and Northern Pinal County that can be implemented over the period from now to 2030. The study evaluated all modes of public transit other than fixed-guideway/high capacity transit to determine how best to meet current and future transportation needs. Fixed-guideway/high capacity transit is being addressed as part of the Central/East Valley Light Rail Transit Project and through the on-going High Capacity Transit Study.

The RTS is a component of the Regional Transportation Plan (RTP) currently under development by the Maricopa Association of Governments (MAG). The RTP is the largest planning initiative in metropolitan area in 4 decades. The last such exercise set the blueprint for the regional freeway network now nearing completion. The new RTP will address the sustained growth that is expected over the next four to five decades and provide a new policy framework to guide regional transportation investments and to establish measures of performance to better monitor and improve the transportation system in the future.

ACKNOWLEDGEMENTS

The RTS was developed under the leadership and guidance of the Regional Public Transportation Authority (RPTA), the Agency Advisors Committee (AAG), local stakeholders, and the general public.

The AAG consists of representatives from RPTA, the Arizona Department of Transportation (ADOT), Maricopa County, the Salt River Indian Community, the Cities of Phoenix, Tempe, Mesa, Scottsdale, Chandler, Glendale, and Avondale. Local stakeholders included representatives of additional cities and towns, including Buckeye, Surprise, Queen Creek, Gilbert, and Goodyear, that participated in the study process. The general public was also asked to participate via the RTS project website (www.valleytransitplan.org), public outreach events, presentations at public and civic forums, and meetings with local officials.

RTS GOALS

The goals for the RTS were established in May 2002 by AAG:

1. Provide transit to encourage mobility and independence for all residents of Maricopa County
2. Encourage use of transit as an alternative to personal auto travel to reduce commute trips and vehicle miles traveled
3. Ensure that transit services meet the goals of the Americans with Disabilities Act (ADA) for persons with disabilities
4. Provide transit access and passenger facilities for major activity centers, employment, education, shopping, medical services, and airports to sustain and encourage economic success for residents and businesses
5. Plan efficient and effective transit to meet community needs and to ensure value; offer innovation in transit service planning to optimize limited resources
6. Develop intermodal transfer centers to increase choices and provide convenient transfers for transit users
7. Provide higher capacity transit in corridors where demand warrants to reduce traffic congestion and to improve air quality
8. Support city comprehensive plans to encourage transit-oriented development
9. Communicate the benefits of transit as an alternative to the automobile to encourage transit riders through effective marketing and customer information; develop communication tools to encourage transit use by children
10. Use innovations in technology such as smart fare media and trip planning software to provide more flexible and convenient transit services

STUDY AREA CHARACTERISTICS

The study area includes all of Maricopa County and some of adjacent Pinal County (**Figure 1**).

0 10 Miles

Population

The population of the study is concentrated in the Phoenix urbanized area and the adjacent Avondale small urban area. Population is expected to grow rapidly in nearly all MPA's over the next 30 years.

Employment

The Phoenix urbanized area is also the largest employment center in the study area. From 2000 to 2030, employment is projected to grow rapidly, especially in outlying areas. Employment in the study area will actually grow faster than population, which suggests that commuters will travel from outside the study area to work within the study area.

Low-Income Households

Low-income households are defined by MAG as those in the bottom quintile of all households in the entire study area; therefore, region-wide, 20 percent of households are always low income. Because the percentage of low-income households is fixed, the total number of low-income households grows at roughly the same rate as the population as a whole (with variation explained by the difference in the growth rate of the population versus that of the number of households). However, the distribution of low-income households varies over time.

Seniors and Persons with Disabilities

The Phoenix area is an area with a large and rapidly growing population of seniors (defined as those over the age of 65). The senior population has specific transportation needs that may be different from those of the general population. Like the senior population, the population of persons with disabilities (defined as those persons age 16-64 who self-reported a disability in the 2000 Census) has specific transportation needs.

A range of transit services are required to meet the mobility needs of the region and these different markets.

STUDY APPROACH

This RTS takes advantage of new census data that was not available when the current RTP was completed in 1999. The AAG desired a flexible planning process that would allow the plan to be updated with new projections for population and employment growth. They further desired that the transit system include a variety of elements to provide choices for Valley residents. A future regional transit system should include both local and regional transit services. Local transit services include neighborhood circulators, regional transit connections between major activity centers, and complementary transit service for persons with disabilities. Regional transit services include transit in rural and developing areas and long-distance, commuter transit, connecting activity centers in the Valley.

A GIS-based planning tool was developed using population, low income household, and employment data available from MAG. The demographic data for 2000 and the current Valley

Metro transit system were used to establish a baseline. These data were then used to quantify transit need (who needs service) and transit supply (how much service is available). By understanding existing transit need, future transit need in the Valley can be predicted as population and employment grow and as the low income population shifts locations within the region.

The planning methodology established a ratio between transit need and transit supply that can be used to predict local transit demand in future years. The planning process can be applied for any target year or population and employment estimate, and for each municipal planning area (MPA) in the Valley.

Transit Need

The basis for the planning methodology described above is that every part of an area has some demand for transit service. By developing an index of transit need (TNI), the need for transit is quantified by aggregating those demographic factors that have a relationship with transit ridership (such as population, employment, household income, age, presence of a disability).

Transit Density

The transit density index (TDI) is used to measure how much transit is supplied. In the case of this project, transit density is described in terms of revenue miles of local service per square mile of area.

Need-Supply Ratio

A ratio of demand to supply (TNI to TDI) was created so that TNI and TDI could be used to predict local transit demand for future years. The ratio was set to the existing level of transit service in the cities of Phoenix and Tempe today, a level deemed appropriate in team discussions with AAG. Other ratios could also have been used to model higher or lower levels of transit service or funding availability.

MAG provided 2030 demographic projections, including population, employment, and low-income households. Using revenue miles of local transit service supplied per unit of need (based on existing Phoenix and Tempe service levels), the future projected TNI for every traffic analysis zone (TAZ) in the study area was used to determine the future need for revenue miles of transit in each TAZ. **Figure 2** depicts 2030 projected transit need.

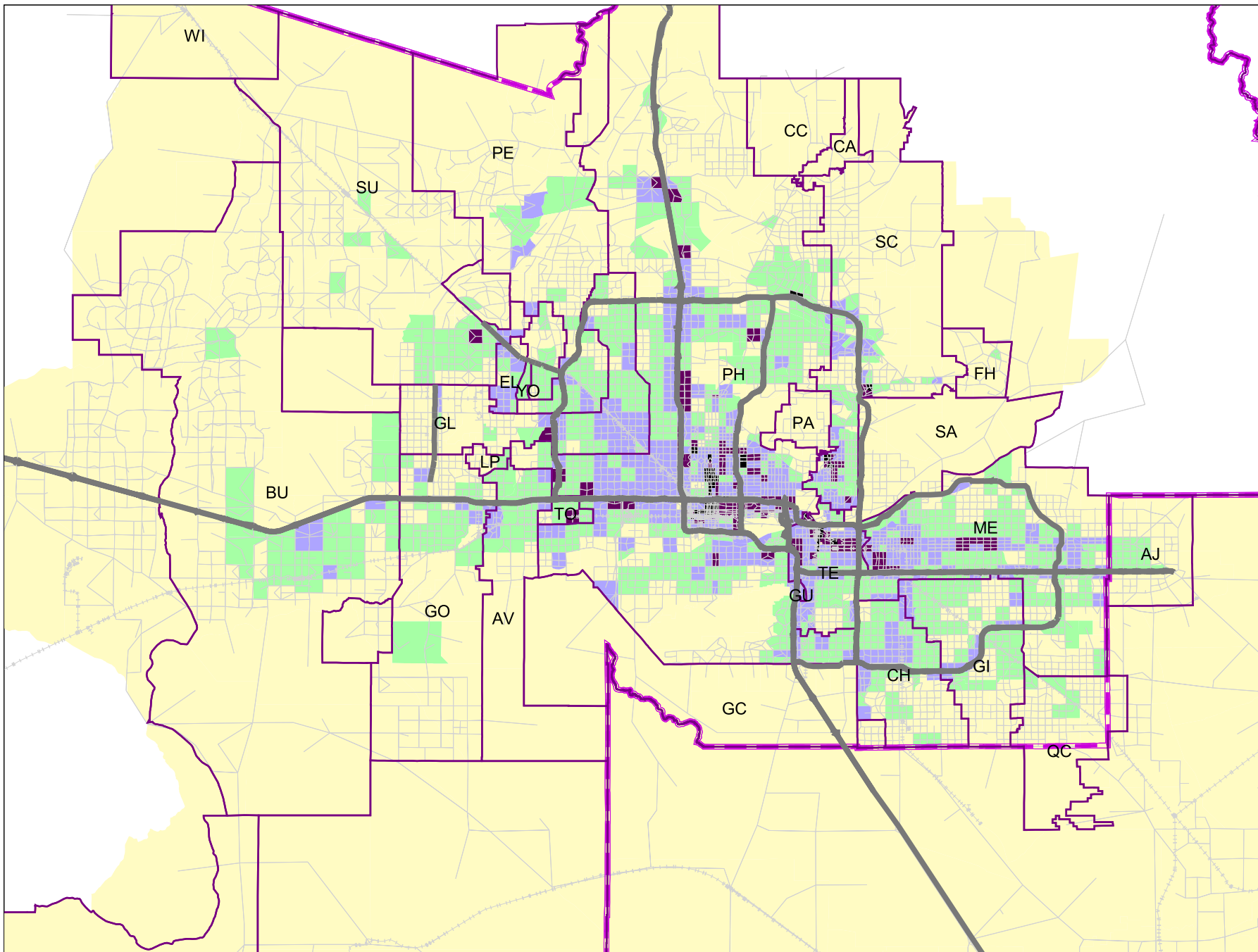
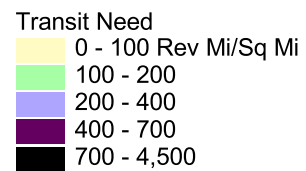


Figure 2
2030 Transit Need

- Interstates & Freeways
- MPA Boundaries
- County Boundaries
- Rails (2000)
- Planned Road Network



0 7 Miles



RTS PLAN

The RTS plan is a phased implementation plan with the horizon year of 2030. Interim operating plans were developed for the years 2010 and 2020, but the remainder of this discussion will focus on the 2030 RTS Plan.

The RTS is designed to serve all needs for transit service in the Valley. Therefore, it contains a number of different service types designed to serve different markets. The following are the components of the RTS:

- Local Transit Service
 - Fixed route local service
 - Circulator / shuttle service
- Rural / Non-Fixed Route Service
- Regional Transit Service
 - Regional local routes
 - Arterial Regional Service
 - Expressway Regional Service
 - Commuter Vanpool Service
- Paratransit
 - ADA-Paratransit
 - Senior Paratransit
- Transit Demand Management (TDM)
- Capital Projects

Local Transit Service

Local transit service provides the backbone of the RTS and makes up the bulk of the revenue hours and miles of service and of the cost of providing the service. Local transit service consists of two categories of fixed route transit:

- Local fixed route - operates along set routes and follows set schedules; operates primarily on arterial streets (e.g. Red, Blue, Yellow, and Green routes)
- Circulator/shuttle routes - provide service within neighborhoods and activity centers and typically operate short routes at high frequencies; may travel on local streets (e.g. FLASH, DASH, ALEX routes)

Local transit service serves all trip purposes, including work, shopping, and educational trips. The service design emphasis is on service area coverage, so that the maximum possible population can access the bus network. Service levels on particular routes are dictated by the demand for transit along those routes. Local service routes typically operate all day, seven days a week, in some cases with higher levels of service during peak hours. Because local routes make multiple stops and travel in mixed traffic, operating speeds can be slow, and riders may choose to use regional transit services for longer trips.

A graphic of the recommended 2030 local service network is shown in **Figure 3**.

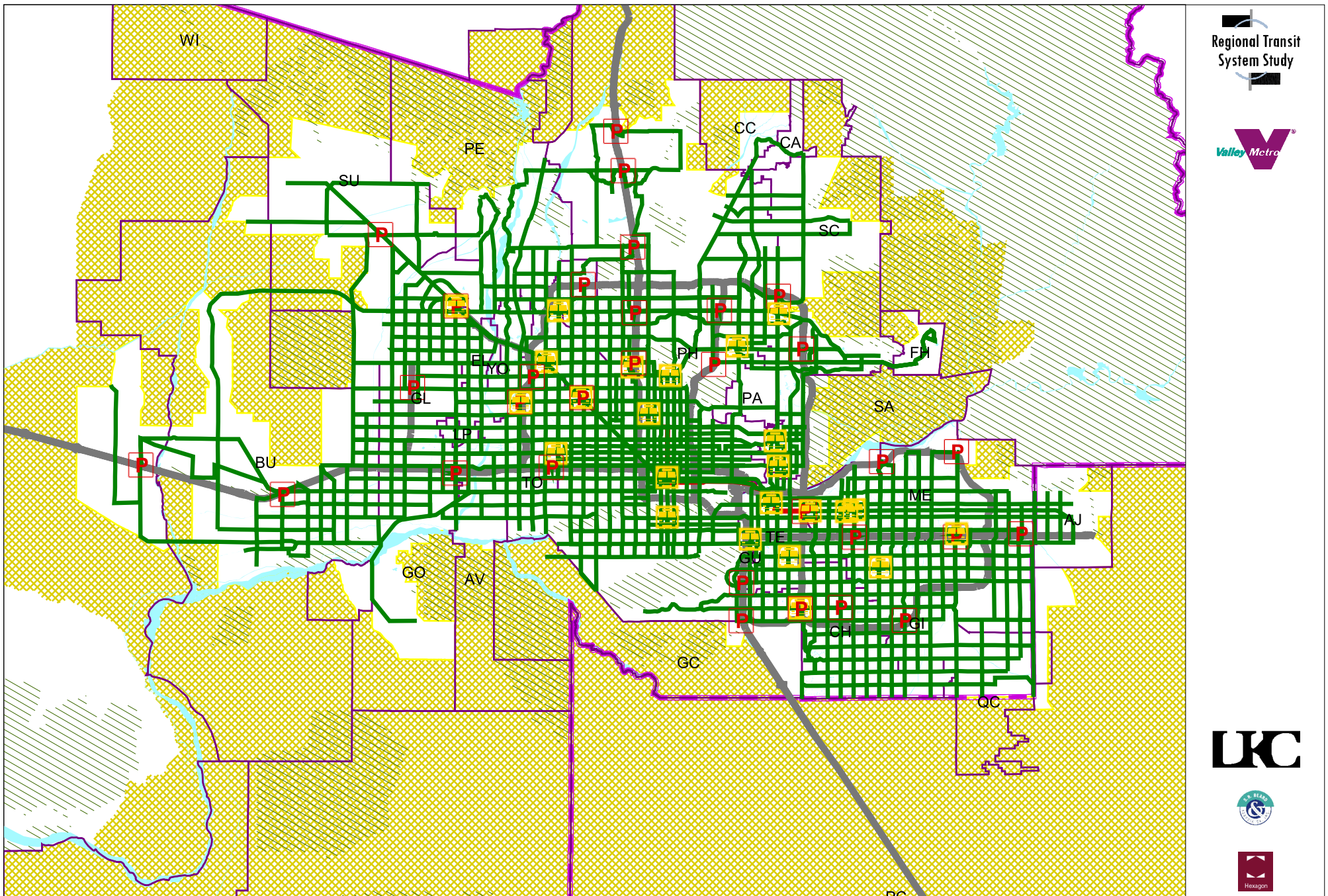


Figure 3
2030 Local Transit

- Passenger Facilities**
- Park & Ride
 - Transit Center
 - Local Fixed Routes
 - C/EV LRT line (MOS)

- Interstates & Freeways
- MPA Boundaries
- County Boundaries
- Undevelopable Space
- Water

- Urban (FR) vs Rural service**
- Rural/transit access area
 - Urban/fixed route area

0 6 Miles



Rural/Non-Fixed Route Service

Rural connections service is a catchall category that includes all transit services operating outside of the urbanized area of Phoenix. For the purposes of the service type, the urbanized area is that part of Phoenix that is served by local fixed route service. Rural connections may include long distance shuttles connecting remote communities with urban transit nodes, circulator services within remote towns such as Gila Bend or Casa Grande, or curbside demand-response service in low-density areas in the urban fringe. In all cases, the focus of service is on connecting rural communities with the urban fixed route network.

A graphic of the recommended 2030 rural transit area is shown in **Figure 4**.

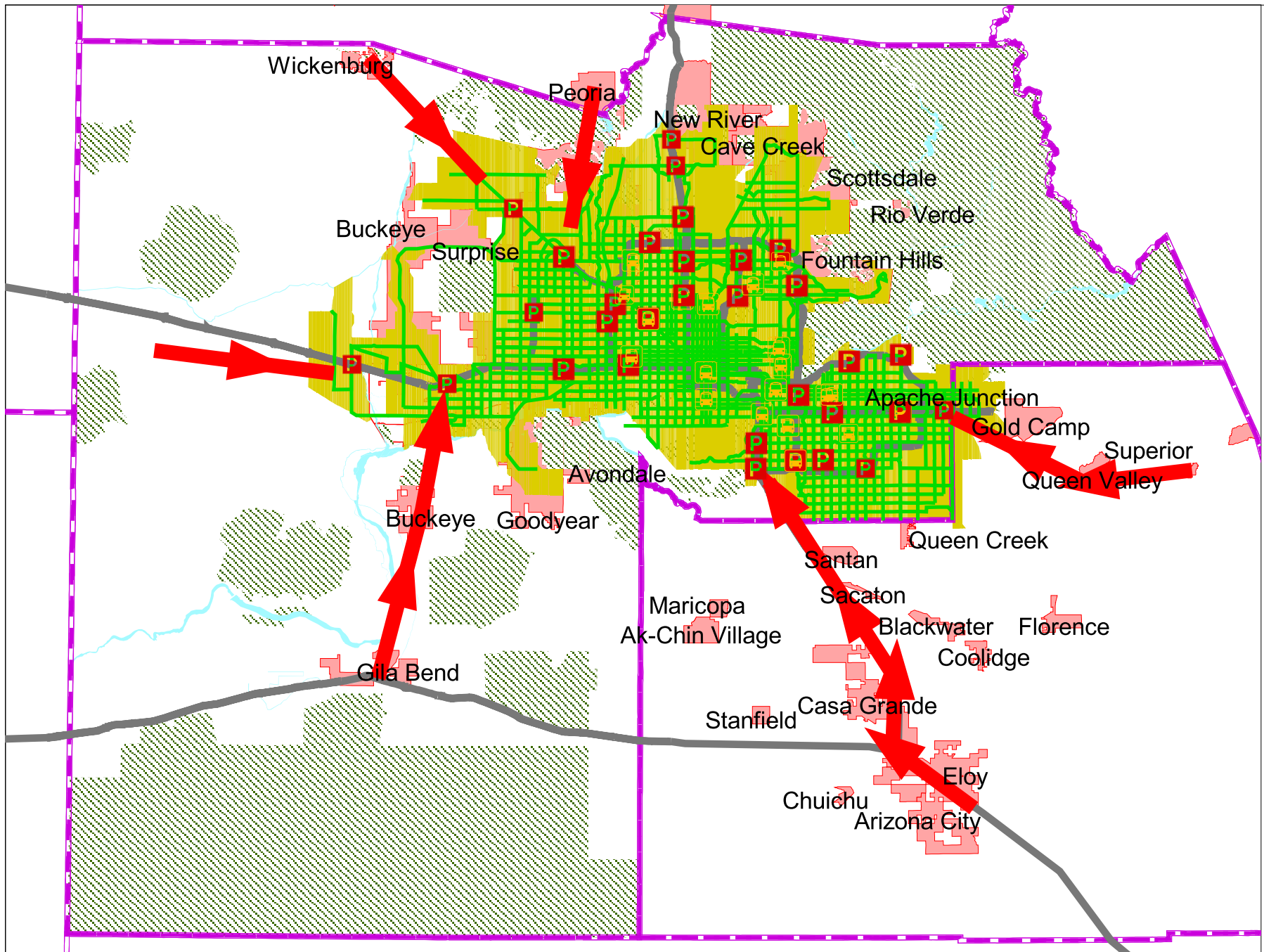


Figure 4
Rural Transit
Service Area

- Potential Rural Access Corridors
- Local Fixed Routes
- P Park & Ride
- Transit Center

- Interstates & Freeways
- County Boundaries
- Urban/fixed route area
- Undevelopable Space

- Water
- Places (2000 Census Definition) Outside 2030 Fixed Rte Area

0 10 Miles



Regional Transit Service

Regional transit services are designed to provide higher speed services for longer trips. Routes are also designed to connect distant activity centers, transportation nodes, or residential areas. Regional transit service consists of four categories of service:

- Regional local routes - local transit routes considered to be regionally significant; by funding these service regionally, a backbone of connecting service is assured regardless of local funding levels
- Arterial regional routes - operate as overlays on corridors served by local fixed route service, but provide higher speed services by operating with limited stops and in some cases with other enhancements such as queue-jumper or signal priority systems
- Expressway regional routes - use existing and proposed high occupancy vehicle (HOV) facilities to connect remote park and ride lots with major activity centers, primarily downtown Phoenix and downtown Tempe; may operate during peak periods only
- Commuter vanpools - allow groups of employees to self-organize and lease a vehicle from Valley Metro

Regional transit services are focused on trips to major activity centers during peak periods, primarily work and school trips. The emphasis of service is on long-distance trips, and, where possible, uses existing capital infrastructure such as HOV lanes and park and ride lots.

A graphic of the recommended 2030 regional transit routes is shown in **Figure 5**.

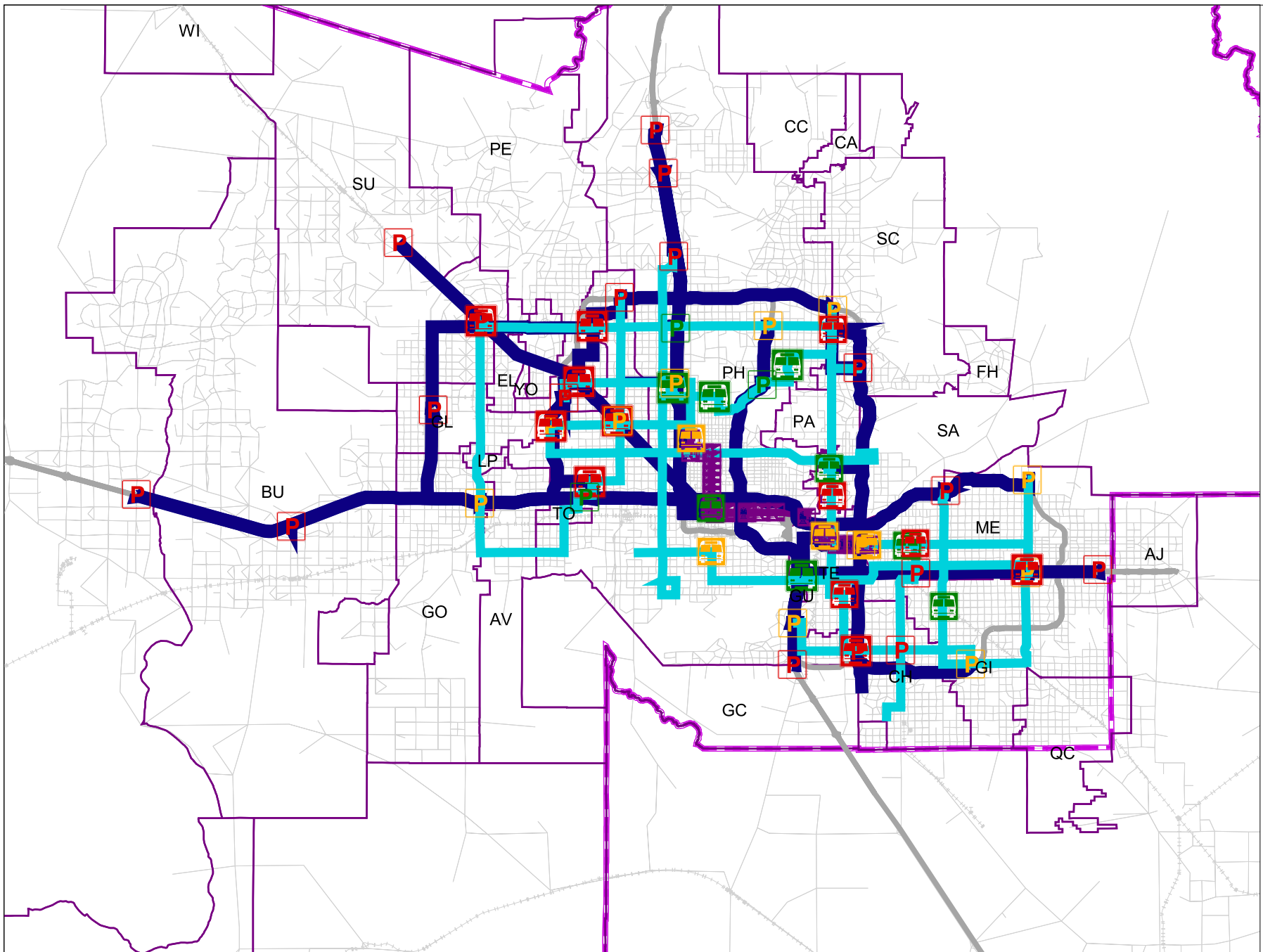


Figure 5
Regional Network



0 6 Miles



Paratransit

Paratransit includes all modes of transit service intended to serve seniors and persons with disabilities only. Paratransit service is demand-responsive and provides curbside pick-ups and drop-offs. Paratransit service may connect with fixed route service at transit centers or other nodes. Paratransit consists of two categories of service:

- ADA-paratransit service is required by ADA for all areas within 3/4-mile of a fixed route for all ADA-certified patrons
- Senior paratransit service is an optional service provided for the senior population or the population with disabilities that do not meet ADA criteria

Paratransit can also include client transportation services such as the existing Reserve-a-Ride service, which provides trips in Phoenix to Senior Centers, or other programs such as taxi vouchers and volunteer driver programs.

Transit Demand Management (TDM)

TDM addresses the demand side of travel behavior. Strategies to manage travel demand attempt to reduce the demand for drive-alone (single occupant) travel on roadways by offering alternatives to driving alone. Local transit, commuter transit service, rail transit, ridesharing, and cycling are all examples of alternate modes. Fewer vehicles on roadways during peak hours allow traffic to move more efficiently.

TDM strategies included in the RTS are low-cost projects and programs that encourage alternative travel modes to driving alone. More expensive projects (i.e., transit service, HOV lanes) are described elsewhere. Examples of TDM strategies include organizing carpools, encouraging flexible time or staggered work hours, and encouraging transit-oriented development.

Capital Projects

The transit services described above require an accompanying network of capital facilities and fleets of vehicles. Capital facilities include operating and maintenance facilities, passenger infrastructure, and passenger facilities.

2030 RTS PLAN

Table 1 below summarizes the primary components of the 2030 RTS.

Table 1
2030 RTS – Primary Components

Service/Vehicle Type	Annual Units	Unit Measurement	Total Fleet
Local Fixed Route (incl Regional Fixed Route)	83,593,000	miles	2,229
Circulators	660,000	miles	215
Non-Fixed Route (Incl Rural)	346,000	miles	221
Arterial Regional Route	6,711,000	miles	179
Expressway Regional Route	6,730,000	miles	179
Vanpool	339,000	Hours	1,036
ADA Paratransit	492,000	Hours	169
Senior Paratransit	554,000	Hours	191
Commuter Bus			179
Transit Bus			2,623
Cut-Away			581
Van			1,036
Total			4,419

Source: LKC

In addition to the service and fleet requirement summarized above, the following are also required:

- Additional operating and maintenance facility capacity
- Bus pullouts and shelters at major passenger transfer points (approx. one-mile intervals)
- 17 additional park and ride lots (in addition to existing and programmed/planned lots)
- 12 expanded or new transit centers (in addition to existing and programmed/planned lots)

FINANCIAL PLAN

The RTS Financial Plan defines cost and revenue, including estimated available funding by source.

Operating Cost

Table 2 provides cumulative operating costs for the intervals 2002-2010, 2011-2020, 2021-2030, 2002-2030, and 2006-2025. The period 2006-2025 is included to correspond to the Regionally Authorized Road Fund (RARF) authorization period.

Table 2
Cumulative Operating Costs (\$2002 in 000s)

Service	2002-2010	2011-2020	2021-2030	2002-2030	2006-2025
Local Fixed Route	\$2,220,300	\$4,165,900	\$4,789,700	\$11,176,000	\$7,871,100
Local Circulator	\$146,600	\$175,000	\$374,800	\$696,400	\$408,000
Total Local Service	\$2,366,900	\$4,340,900	\$5,164,500	\$11,872,400	\$8,279,100
Rural / Non-Fixed Route	\$40,800	\$117,900	\$171,300	\$330,000	\$230,700
Regional Local Routes	\$0	\$0	\$0	\$0	\$0
Expwy Regional Service	\$132,900	\$251,800	\$326,000	\$710,700	\$512,100
Arterial Regional Service	\$73,400	\$237,000	\$328,700	\$639,100	\$457,800
Total Regional Service	\$206,300	\$488,800	\$654,700	\$1,349,800	\$969,900
Commuter Vanpool Service	\$36,700	\$75,000	\$94,400	\$206,100	\$144,400
ADA-Paratransit	\$114,700	\$163,100	\$199,500	\$477,400	\$325,900
Senior-Paratransit	\$129,200	\$183,600	\$224,600	\$537,300	\$366,800
Total Paratransit	\$243,900	\$346,700	\$424,100	\$1,014,700	\$692,700
TDM / Rideshare	\$28,900	\$53,700	\$65,100	\$147,700	\$103,200
Contingency	\$27,000	\$30,000	\$30,000	\$87,000	\$60,000
Total Operating Costs	\$2,950,500	\$5,453,000	\$6,604,100	\$15,007,700	\$10,480,000

Source: LKC

Capital Cost

Table 3 provides cumulative capital costs for the intervals 2002-2010, 2011-2020, 2021-2030, 2002-2030, and 2006-2025.

Table 3
Cumulative Capital Costs (\$2002 in 000s)

Service	2002-2010	2011-2020	2021-2030	2002-2030	2006-2025
Commuter Bus	\$44,100	\$62,600	\$28,400	\$135,000	\$84,200
Transit Bus	\$368,900	\$434,700	\$387,100	\$1,190,700	\$895,700
Cut-Away	\$10,200	\$18,200	\$7,300	\$35,700	\$29,900
Van	\$10,200	\$23,500	\$16,100	\$49,700	\$39,000
Total Vehicles	\$433,400	\$539,000	\$438,900	\$1,411,100	\$1,048,800
Heavy Maintenance	\$33,800	\$0	\$33,800	\$67,600	\$67,600
Bus Operating Facility	\$195,600	\$153,200	\$108,500	\$457,300	\$270,400
Cut-Away Maintenance Facility	\$9,300	\$9,300	\$9,300	\$27,800	\$18,500
Van Maintenance Facility	\$6,000	\$0	\$0	\$6,000	\$1,800
Total Maintenance Capacity	\$244,700	\$162,500	\$151,600	\$558,700	\$358,300
Passenger Shelters	\$14,100	\$12,800	\$7,400	\$34,300	\$24,300
Bus Pull-Outs	\$56,400	\$51,100	\$29,700	\$137,200	\$97,000
Total Passenger Infrastructure	\$70,500	\$63,900	\$37,100	\$171,500	\$121,300
Park & Ride Lots	\$111,500	\$48,900	\$73,600	\$234,000	\$110,000
Transit Centers	\$19,500	\$17,000	\$19,200	\$55,800	\$35,400
Total Passenger Facilities	\$131,000	\$65,900	\$92,800	\$289,800	\$145,400
Total Capital Cost	\$879,600	\$831,300	\$720,400	\$2,431,100	\$1,673,800

Source: LKC

Revenue

The operating and capital costs are funded through three primary categories of revenue:

- Federal
 - Sections 5307, 5309, 5310, and 5311
 - Congestion Mitigation and Air Quality (CMAQ)
 - Surface Transportation Program (STP)
 - Community Development Block Grant (CDBG)
- State
 - Local Transportation Assistance Fund (LTAF)
- Local
 - Dedicated Sales Tax in Phoenix, Glendale, Tempe, and Mesa
 - City General Funds
 - Farebox Income
 - ASU fee
 - Advertising

A methodology was developed to estimate future funding from each source. **Table 4** shows the results of that methodology.

Table 4
Cumulative Revenues, 2002-2030 (\$2002, in 000's)

Funding Source	2002-2010	2011-2020	2021-2030	2002-2030	2006-2025
Federal	\$1,016,700	\$1,171,600	\$1,289,200	\$3,477,400	\$2,458,100
State	\$80,600	\$74,000	\$60,400	\$215,000	\$157,800
Local*	\$2,273,100	\$3,748,900	\$5,193,400	\$11,215,300	\$7,747,400
Total	\$3,370,400	\$4,994,400	\$6,543,000	\$14,907,800	\$10,363,400

Source: LKC *Does not include RARF

Net Costs

Table 5 shows the total estimated shortfall for service for the intervals 2002-2010, 2011-2020, 2021-2030, and 2006-2025.

Table 5
Funding Surplus or (Deficit), 2002-2030 (\$2002, 000's)

Year	2002-2010	2011-2020	2021-2030	2002-2030	2006-2025
Revenue*	\$3,370,400	\$4,994,400	\$6,543,000	\$14,907,800	\$10,363,400
Operating Cost	\$2,950,500	\$5,453,000	\$6,604,100	\$15,007,700	\$10,480,000
Surplus or (Deficit)	\$419,900	(\$458,600)	(\$61,100)	(\$99,900)	(\$116,600)

Source: LKC *Does not include RARF

CONCLUSION

As population and employment continue to grow, so will the need and demand for transit services at the local and regional level. Local service will require a source of locally generated revenues, either from a specifically dedicated tax source or the general revenues of the local cities and towns. Regional transit service will require a source of regionally generated revenue to provide infrastructure and services that benefit all communities by providing mobility; independence; access; and effective, efficient, innovative, and convenient transportation alternatives.